



# GROBID for Humanities When engineering meets History

Charles Riondet, Luca Foppiano

## ► To cite this version:

Charles Riondet, Luca Foppiano. GROBID for Humanities When engineering meets History. Text as a Resource. Text Mining in Historical Science, Institut Historique Allemand, Jun 2017, Paris, France. hal-01585693

**HAL Id: hal-01585693**

**<https://inria.hal.science/hal-01585693>**

Submitted on 11 Sep 2017

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# GROBID for Humanities

## When engineering meets History

Charles Riondet, Luca Foppiano  
ALMAAnaCH, Inria Paris

# Acknowledgement

Anne Baillot (Centre Marc Bloch, Berlin) → German literature and History,  
Mastermind

Hector Martinez Alonso (ALMAAnaCH, Inria Paris) → POS tagging, NLP stuff

# Context

ALMAnaCH = Automatic Language Modelling and Analysis & Computational Humanities, joint EPHE-Inria team

A strange mixture of people with different skills working side by side:

- Computer engineering → data mining, information extraction
- NLP experts → Semantic and Syntactic analysis, Parsing, etc..
- Digital Humanities (History and Literature background) → data modelling, textual analysis, digital philology

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**Why not combining all the skills available around?**

# Who are we?



Charles Riondet - Historian

WW2  
data modeling



Luca Foppiano - Engineer

Software engineering, Data mining,  
Machine learning, Knowledge discovery

# Original hermeneutical process

In this situation, we started with some empirical tries

*Person 1: "Hey, I have data"*

*Person 2: "Hey, I have tools"*

# Original hermeneutical process

In this situation, we started with some empirical tries

*Person 1: "Hey, I have data"*

*Person 2: "Hey, I have tools"*

*Person 1 and 2 (ecstatic): **"Let's try to use tools on some random data (YOLO)"***



# Original hermeneutical process

But with a research question, it worked a little better:

*Person 1: "Hey, I have data."*

*Person 2: "Hey, I have tools."*

*Person 1: **"Waow, I also have an idea of what I want to do"***

*Person 2: **"Maybe my tools could help you shedding some light"***

# Original hermeneutical process

Next step, we started to think about a win-win strategy"

*Person 1: "Hey, I have data and a research question"*

*Person 2: "Hey, I have tools"*

*Person 1: **"Your tools might need new data and use cases to improve  
(ensure genericity and cross-domain applicability)"***

# Original hermeneutical process

Finally...

*Person 1: "Hey, I have data."*

*Person 2: "Hey, I have tools."*

*Person 3: "Hey guys, I also have data, tools and some nice research questions"*

*Person 4: "I want to be part of the group, please"*

*Choir : "Let's create a research project all together"*

# ECRPER project (ANR/DFG, 2018-2021)

Franco-german personal writings in wartime (19th-20th century)

With ALMAAnaCH (Inria Paris) - DHI (Paris) - Centre Marc Bloch (Berlin) - IEP Lille

Analysing German and French diaries and letters written during the French-German wars since the 19th century:

- Napoleonic Wars
- War of 1870
- First World War
- Second World War

Funding is not granted yet, but we're in a hurry, so we already started to work.

# ECRPER in short

- 1) Diachronic and synchronic analysis:
  - how the Self and the Other are being represented
  - how relationship to events is being elaborated through personal writings
- 2) Bring together different tools, sets up a solid editorial and hermeneutical workflow and make it available for further research.
  - OCR
  - Annotation
  - Edition
  - publication

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  - OCR
  - **Annotation**
  - Edition

# Representation of the other

The representation of the other in the context of war discourses

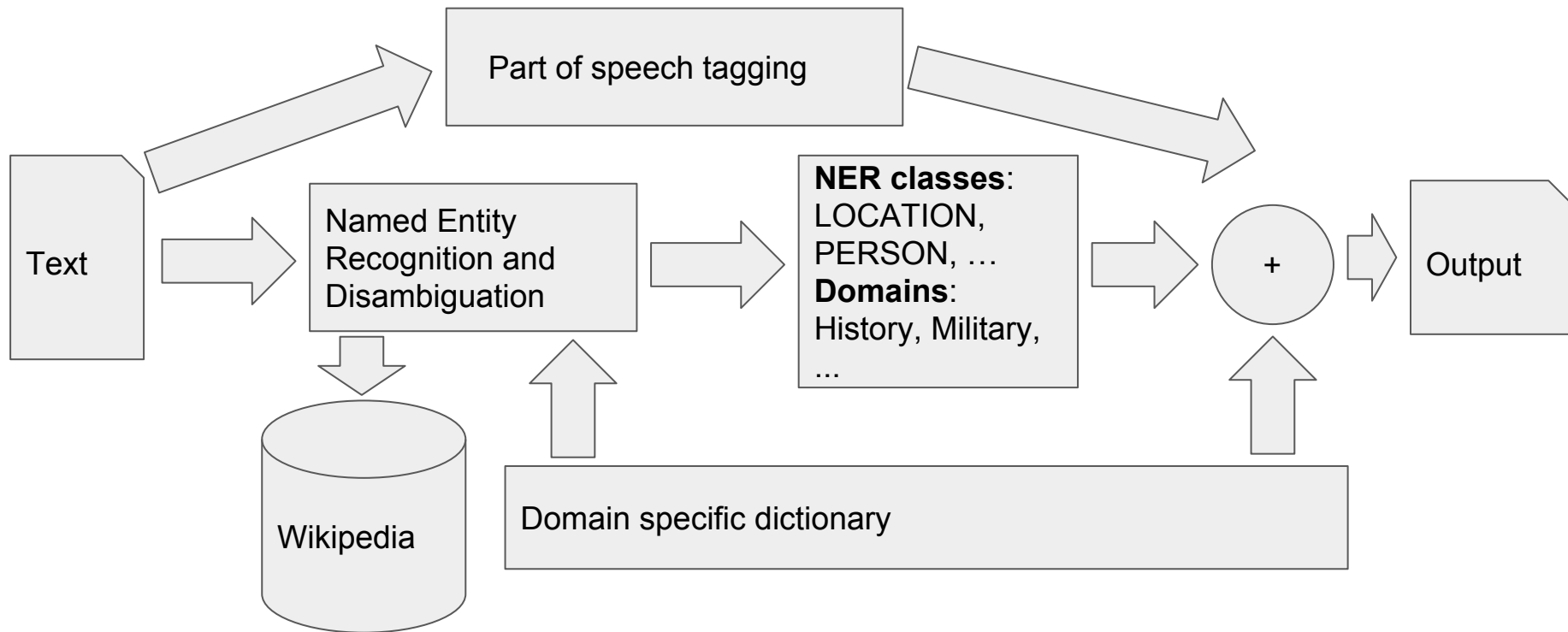
- How Germans see the French and reciprocally.
- Broaden to all the mentions of the conflicts actors (Nations, organisations, persons, person types, ...)
- All instances appearing in the discourse will be modeled and brought in relation to one another.
- Diachronic analysis: appearance and disappearance of a mention, semantic evolution, spelling variations, ...

# Representation of the other: NLP approach

- The other/the actors of the conflicts  
→ a set of Named-entities
- Recognize structural discourse elements in French and in German  
→ Part of speech tagging
  - Opinion mining → lexical analysis of the context of the mentions
  - likely to vary according to time and nation + social origin of the writer.



# The big picture



# (N)ERD, a tool for Named Entity Recognition and Disambiguation

GROBID (N)ERD is a tool for recognise and extract named entities from text or PDF documents. They are then resolved (disambiguated) against Wikipedia.

E.g. The **president Washington** went to **Washington** to celebrate his birthday.

Normalized: **George Washington**

conf: 0.7604841161333109



**George Washington** (; – , 1799) was an American politician and soldier who served as the **first President of the United States** from 1789 to 1797 and was one of the **Founding Fathers of the United States**. He served as **Commander-in-Chief** of the **Continental Army** during the **American Revolutionary War**, and later presided over the **1787 convention** that drafted the **United States Constitution**. He is popularly

Type: **LOCATION**

Sense: **municipality/N1**

Normalized: **Washington, D.C.**

Domains: **Administration**

conf: 0.9376965404365496



**Washington, D.C.**, formally the **District of Columbia** and commonly referred to as **Washington**, "**the District**", or simply **D.C.**, is the capital of the **United States**, founded on July 16, 1790. The **U.S. Constitution** allows for the creation of a special district to serve as the permanent national capital. The District is therefore not a part of any **U.S. state** and is instead directly overseen by the

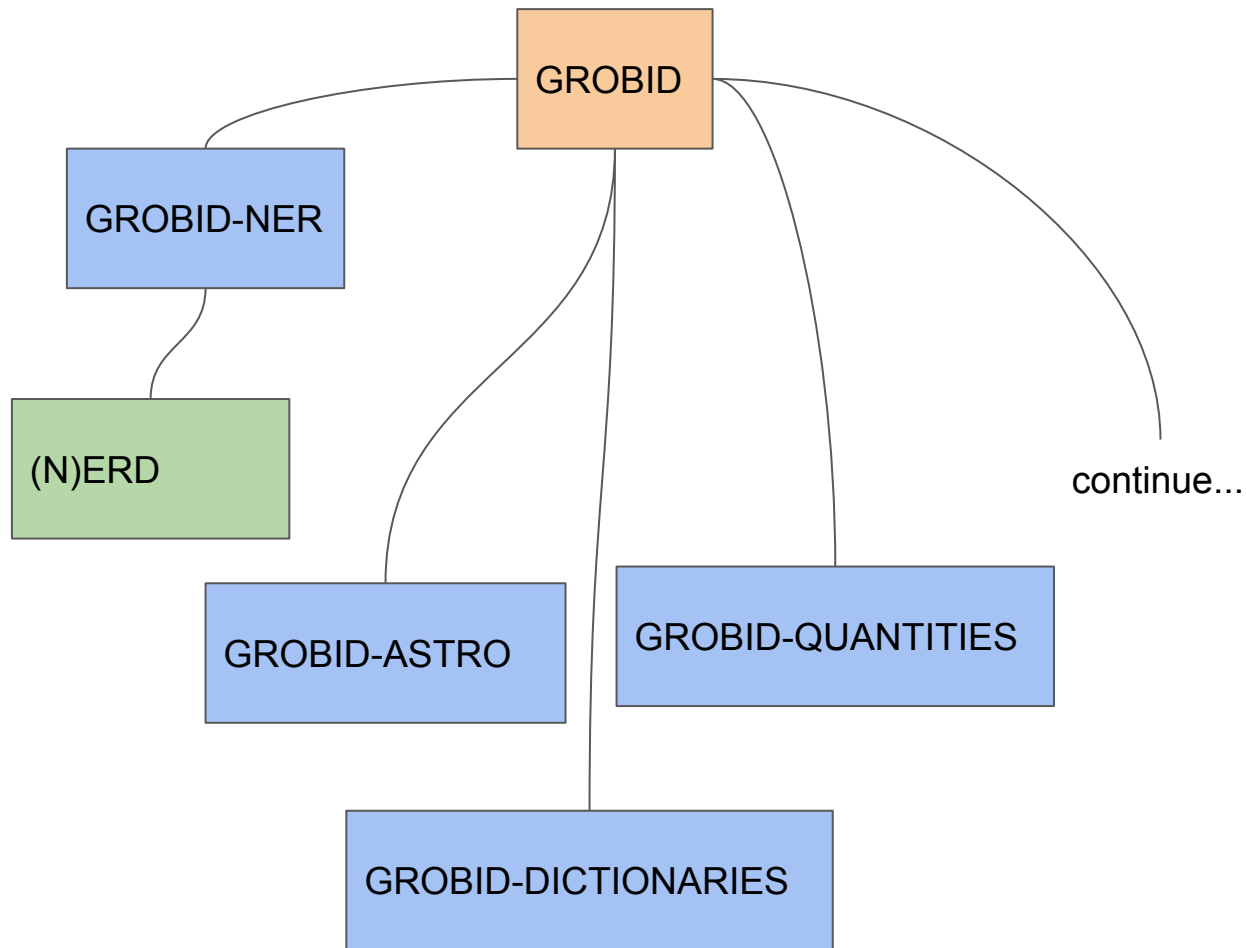
# Overview of the *GROBID* Family

GROBID (or Grobid) means  
GeneRation Of Bibliographic Data.

Written by Patrice Lopez and  
released open source (Licence  
Apache 2.0).

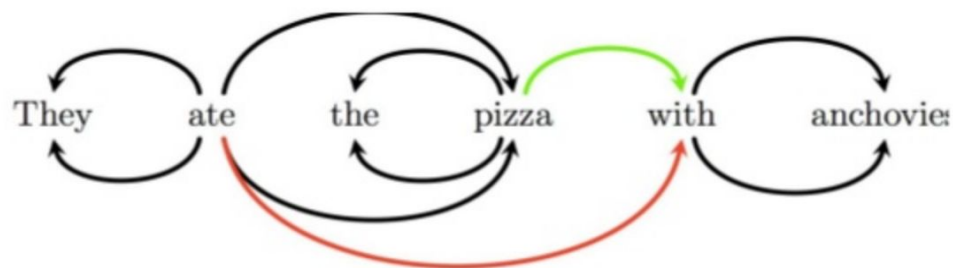
Available on Github:

- <http://github.com/kermitt2/grobid>
- <http://github.com/kermitt2/grobid-ner>
- <http://github.com/kermitt2/nerd>
- [...]

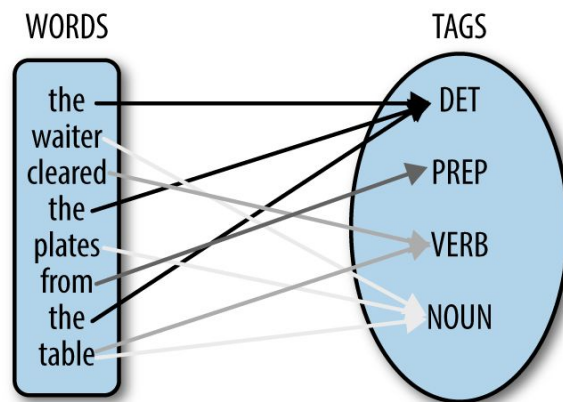


# Part of speech tagging (in one slide)

Syntactic analysis of sentences, produces dependency tree and tags (noun, verb, adj, etc.)



```
nsubj(ate-2, They-1)
root(ROOT-0, ate-2)
det(pizza-4, the-3)
dobj(ate-2, pizza-4)
prep(ate-2, with-5)
pobj(with-5, anchovies-6)
```



[1] <https://www.slideshare.net/vseloved/crash-course-in-natural-language-processing-2016>

[2] <http://naviglinlp.blogspot.fr/2017/04/lecture-7-part-of-speech-tagging.html>

# The corpus: WW2 diaries written in French

## **Journal de Léo Hamon (Archives nationales, 72AJ42)**

- French Lawyer of Russian origin, one of the leaders of Parisian Resistance.
- underground daily life, reports on meetings, comments on the course of the war and on the organization of the Resistance and on the preparation of the seizure of power in Paris.

## **Journal d'Henri Chabasse (Musée de la Résistance nationale, 13/3907b)**

- Nationalist middle-class Parisian, not involved in the Resistance nor in the Collaboration.
- Daily life but mostly comments on the course of the war and French political situation, from D-Day to fall 1944 (+ an entry related to Hiroshima bombing)

# Need a specific dictionary

## **Context based expressions**

Ex: "Souris grises" → German army female auxiliaries (not the animal)

## **Diary internal terminology**

Ex: "les cocs" → Members of the communist party (not the animal badly written)

## **Unnormalized spelling**

Ex: Gaulisme → Gaullisme

## **Metonymies**

Ex: Vichy → Régime de Vichy (not Vichy town)

# Need a specific dictionary

Because Wikipedia doesn't know everything.

Sources:

- Marcot et al., Dictionnaire historique de la Résistance, Paris, R. Laffont, 2006.
- Rue de la Mémoire, Volksbund Deutsche Kriegsgräberfürsorge e.V., 2016, Parler de l'Histoire et de la Mémoire. Première et Deuxième guerre mondiale. Glossaire Franco-allemand.
- Specific terms found in the diaries

# Need a specific dictionary

Modeled in TEI-TBX  
(thanks to Stefan Pernes)

- Machine-readable
- Standard

```
<conceptEntry xml:id="c_217">
  <langSec xml:lang="fr">
    <form type="lemma">
      <orth>Parti communiste français</orth>
    </form>
  </langSec>
</conceptEntry>

<conceptEntry xml:id="c_218">
  <descrip type="subordinateConceptPartitive" target="#c_217"/>
  <langSec xml:lang="fr">
    <form type="lemma">
      <ref target="#Hamon_AN72AJ42"/>
      <orth>communiste</orth>
    </form>
    <form type="variant">
      <ref target="#Hamon_AN72AJ42"/>
      <orth>coc</orth>
    </form>
  </langSec>
</conceptEntry>
```



## 4 main steps

- 1) Extract Named Entities
- 2) Apply domain specific dictionary
- 3) POS tagging
- 4) Mixing up everything (POS and NER)

# Workflow (1) - Extract Named Entities

PERSON

Nous parlons du procès **Pucheu**. La question est plus actuelle. (...)

J'indique qu'à mon avis tout ce procès a été mal conduit - il fallait (...) proclamer que devant des crimes inouïs, (...) la nation prenait une décision politique, immoler les hommes de la haute trahison : "Jetons à l'Europe, en défi, une tête de roi",

LOCATION

jetons aux combinards de **Vichy** et de **Washington**, en défi, une tête de traître. (...)

LOCATION

PERSON

Je vois **Yves** qui m'avait cité l'impatience **d'Alger** devant le cas **Pucheu** comme

LOCATION

PERSON

ORGANISATION

une illustration de la crise du **Gaulisme**.

*Journal de Léo Hamon, March 14th 1944 entry*

## Workflow (2) - Apply domain specific dictionary

Nous parlons du procès Pucheu. La question est plus actuelle. (...)

Régime de Vichy

État Français

United States of America

aux combinards de **Vichy** et de **Washington**, en défi, une tête de traître. (...)

Comité français de Libération nationale

Je vois Yves qui m'avait cité l'impatience **d'Alger** devant le cas Pucheu comme une illustration de la crise du **Gaulisme**.

Movement inspired by  
De Gaulle

*Journal de Léo Hamon, March 14th 1944*

# Resolving ambiguities - Vichy

## (N)ERD

About **Services** Admin Doc

Service to call

Entities

Response

Number of ambiguous concepts: 21

### Vichy

Cond. prob.: 0.6867525298988041

**Vichy** est une commune française, située dans le sud-est du département de l'Allier, rattachée à la grande région Auvergne-Rhône-Alpes. Ses habitants sont appelés les *Vichyssois*.



### Régime de Vichy

Cond. prob.: 0.20975160993560257

Le nom de **régime de Vichy** désigne le régime politique dirigé par le maréchal Philippe Pétain, qui assure le gouvernement de la France au cours de la Seconde Guerre mondiale, du au durant l'occupation du pays par l'Allemagne nazie. Le régime est ainsi dénommé car le gouvernement siégeait à Vichy, situé en zone libre.



# Resolving ambiguities

GROBID (N)ERD supports context customisation

The customisation is a way to specialize the entity resolution for a particular domain/profile, for example selecting the correct Vichy wikipedia entry related to the ww2 context.

Specific dictionaries can then be integrated seamlessly in the tool.

**NOTE:** When wikipedia doesn't provide a page for the *alternative* meaning, this approach cannot be applied.

# Workflow (1) - Extract Named Entities

LOCATION Place de la République, LOCATION Hotel Moderne, vaste bâtisse où étaient logées  
les petites ANIMAL souris grises, d'autres disent « les ANIMAL Salamandres », jeunes NATIONAL allemandes  
en uniforme. Elles partent et elles ne pouvaient emporter qu'un léger bagage à la  
main. (...)

*Journal d'Henri Chabasse, August 13th 1944*

# Adjusting entity resolution

No wikipedia page, no party.

The dictionary is then used to override the resolution phase to force the correct definition.

This approach is very specific, less frequent and should be only a fallback solution

E.g. presence of nicknames in the text

## Workflow (2) - Combining dictionaries

Place de la République, Hotel Moderne, vaste bâtisse où étaient logées les petites **souris grises**, d'autres disent « les **Salamandres** », jeunes allemandes en uniforme. Elles partent et elles ne pouvaient emporter qu'un léger bagage à la main. (...)

German army female auxiliaries

A diagram consisting of a light gray rounded rectangle containing the text 'German army female auxiliaries'. Two curved lines originate from this box: one points to the green-highlighted text 'souris grises' in the paragraph above, and the other points to the green-highlighted text 'Salamandres' in the same paragraph.

*Journal d'Henri Chabasse, August 13th 1944*

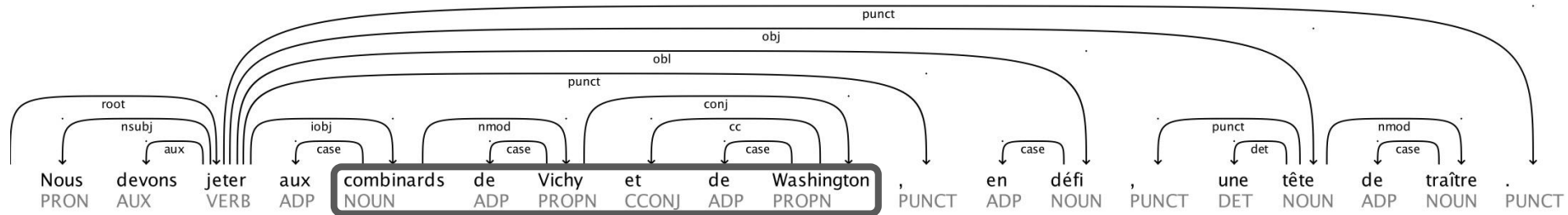


# Workflow (3) - POS tagging and parsing

*“Nous devons jeter aux combinards de Vichy et de Washington, en défi, une tête de traître.”*

The dependency tree can be used to find expressions and modifiers relative to the entities of interest.

E.g. named entity "Vichy" (*i.e.* Régime de Vichy) and Washington (*i.e.* the US government)  $\Leftrightarrow$  nominal modifier "combinards"



## Workflow (4) - mixing everything

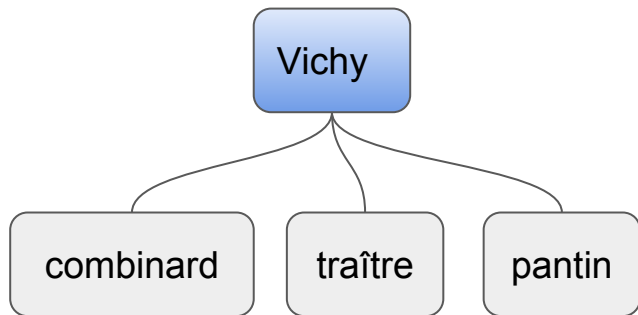
Nous parlons du procès Pucheu. La question est plus actuelle. (...)

J'indique qu'à mon avis tout ce procès a été mal conduit - il fallait (...) proclamer que devant des crimes inouïs, (...) la nation prenait une décision politique, immoler les hommes de la haute trahison : "Jetons à l'Europe, en défi, une tête de roi", jetons aux **combinards** de Vichy et de Washington, en défi, une tête de traître. (...)

Je vois Yves qui m'avait cité **l'impatience** d'Alger devant le cas Pucheu comme une illustration de **la crise du Gaulisme**.

*Journal de Léo Hamon, March 14th 1944 entry*

# Workflow (5) - expected results



List of Named entity modifiers  
and expressions

German Army  
female auxiliaries



Onomasiological terminology

# Next steps

- Apply this workflow to a very large and diverse corpus  
→ Multilingual terminology with the specific terms for each war
- Add sentiment polarity tagging layer
- Nice results visualisation

Thank you